

CLAIMS

What is claimed is:

1. An ESD-protection structure, comprising:
an integrated circuit having a lighter doped p-silicon well (P- well);
a lighter doped n-silicon well (N- well) in the P- well;
a plurality of heavier doped p-silicon diffusions (P+ diffusions) in the N- well;
a first heavier doped n-silicon diffusion (N+ diffusion) in the N- well,
wherein the first N+ diffusion surrounds the plurality of P+ diffusions and overlaps the N- well into the P- well;
a second heavier doped n-silicon diffusion (N+ diffusion) in the P- well,
wherein the second N+ diffusion surrounds the first N+ diffusion;
a bond pad connected to the plurality of P+ diffusions; and
a connection to the second N+ diffusion.
2. The ESD-protection structure of claim 1, wherein the P- well is the integrated circuit substrate.
3. The ESD-protection structure of claim 1, further comprising a field oxide located between the first and second N+ diffusions.

4. The ESD-protection structure of claim 1, further comprising a lighter doped n-silicon substrate (N- substrate) of the integrated circuit, wherein the P- well is in the N- substrate.

5. The ESD-protection structure of claim 1, wherein the plurality of P+ diffusions are stripe shaped.

6. The ESD-protection structure of claim 1, wherein the plurality of P+ diffusions are rectangular shaped.

7. The ESD-protection structure of claim 1, wherein the plurality of P+ diffusions are square shaped.

8. The ESD-protection structure of claim 1, wherein the bond pad is connected to the plurality of P+ diffusions with a first plurality of conductive vias.

9. The ESD-protection structure of claim 1, wherein the connection to the second N+ diffusion is with a second plurality of conductive vias.

10. The ESD-protection structure of claim 8, wherein the first plurality of conductive vias are metal.

11. The ESD-protection structure of claim 8, wherein the first plurality of conductive vias comprise conductive semiconductor silicon.

12. The ESD-protection structure of claim 9, wherein the second plurality of conductive vias are metal.

13. The ESD-protection structure of claim 9, wherein the second plurality of conductive vias comprise conductive silicon.

14. The ESD-protection structure of claim 1, further comprising a second connection to the first N+ diffusion with a third plurality of conductive vias.

15. The ESD-protection structure of claim 1, wherein the P- well is coupled to ground.

16. The ESD-protection structure of claim 1, wherein the P- well is coupled to a common power supply rail.

17. The ESD-protection structure of claim 1, wherein the plurality of P+ diffusions, the first N+ diffusion and the N- well are located substantially under the bond pad.

18. An ESD-protection structure, comprising:
an integrated circuit having a lighter doped p-silicon well (P- substrate);
a lighter doped n-silicon well (N- well) in the P- substrate;
a plurality of heavier doped p-silicon diffusions (P+ diffusions) in the N- well, wherein the plurality of P+ diffusions are rectangular shaped;
a first heavier doped n-silicon diffusion (N+ diffusion) in the N- well, wherein the first N+ diffusion surrounds the plurality of P+ diffusions and overlaps the N- well into the P- well;

a second heavier doped n-silicon diffusion (N⁺ diffusion) in the P- substrate, wherein the second N⁺ diffusion surrounds the first N⁺ diffusion;
a field oxide located between the first and second N⁺ diffusions;
a bond pad connected to the plurality of P⁺ diffusions; and
a connection to the second N⁺ diffusion.

19. The ESD-protection structure of claim 18, wherein the bond pad is connected to the plurality of P⁺ diffusions with a first plurality of conductive vias.

20. The ESD-protection structure of claim 18, wherein the connection to the second N⁺ diffusion is with a second plurality of conductive vias.

21. The ESD-protection structure of claim 19, wherein the first plurality of conductive vias are metal.

22. The ESD-protection structure of claim 19, wherein the first plurality of conductive vias comprise conductive semiconductor silicon.

23. The ESD-protection structure of claim 20, wherein the second plurality of conductive vias are metal.

24. The ESD-protection structure of claim 20, wherein the second plurality of conductive vias comprise conductive semiconductor silicon.

25. The ESD-protection structure of claim 18, wherein the P- well is coupled to ground.

26. The ESD-protection structure of claim 18, wherein the P- well is coupled to a common power supply rail.

27. The ESD-protection structure of claim 18, wherein the plurality of P+ diffusions, the first N+ diffusion and the N- well are located substantially under the bond pad.

28. A system for protecting an integrated circuit from ESD damage, said system comprising:

an ESD-protection structure for at least one of a plurality of input and output connections of an integrated circuit, wherein the ESD-protection structure comprises:

an integrated circuit having a lighter doped p-silicon well (P- well);

a lighter doped n-silicon well (N- well) in the P- well;

a plurality of heavier doped p-silicon diffusions (P+ diffusions) in the N- well;

a first heavier doped n-silicon diffusion (N+ diffusion) in the N- well, wherein the first N+ diffusion surrounds the plurality of P+ diffusions and overlaps the N- well into the P- well;

a second heavier doped n-silicon diffusion (N+ diffusion) in the P- well, wherein the second N+ diffusion surrounds the first N+ diffusion;

a bond pad connected to the plurality of P+ diffusions; and

a connection to the second N+ diffusion.